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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,319	07/02/2001	Toshiaki Shinohara	210314US2	6650
22850	7590	10/19/2004	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			NGUYEN, DILINH P	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/895,319	Applicant(s) SHINOHARA, TOSHIAKI	
	Examiner DiLinh Nguyen	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 7 is/are rejected.
- 7) ☒ Claim(s) 4,6 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/14/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Majumdar et al. (U.S. Pat. 5703399) in view of Wensel (U.S. Pat. 5959349).

Majumdar et al. disclose a semiconductor device (fig. 13) comprising:

a semiconductor element 4a;

a lead frame 3 having a first surface on which the semiconductor element is mounted, and a second surface opposite to the first surface;

a metal block 1 on the second surface of the lead frame;

a bonding material 2 bonding between the second surface of the lead frame and the metal block; wherein the bonding material 2 has a high heat conduction (column 8, line 18).

Majumdar et al. fail to disclose an insulation layer on the metal block opposite the lead frame.

Wensel discloses a semiconductor device (cover fig.) comprising:

a semiconductor element 214;

a metal block 216 on a second surface of a lead frame 220;

an insulation layer 228 (column 5, lines 60 et seq.) on the metal block opposite the lead frame. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Majumdar et al. to prevent damage to the mold and heat sink, as shown by Wensel (column 2, lines 62-67).

- Regarding claim 2, Majumdar et al. and Wensel disclose the metal block is disposed in opposed relation to the semiconductor element (fig. 13).
- Regarding claim 5, Wensel discloses a resin package 224 configured to seal the semiconductor element, the lead frame and the metal block while uncovering the insulating layer 228, wherein the insulating layer has a higher heat conduction than the resin package (cover fig.).
- Regarding claim 7, Majumdar et al. disclose the metal block has a first surface and a second surface; wherein the first surface of the metal block is closer, as viewed in a vertical direction, to the lead frame than is the second surface of the metal block, and wherein the bonding material 2 lies between the second surface of the lead frame 3 and the first surface of the metal block 1 (fig. 13).

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Majumdar et al. (U.S. Pat. 5703399) in view of Wensel (U.S. Pat. 5959349) and further in view of Tanaka et al. (U.S. Pat. 5293301).

Majumdar et al. and Wensel fail to disclose the metal block has a wider surface opposite the bonding material than the bonding material.

Tanaka et al. disclose a semiconductor device (cover fig.) comprising a metal block 25 has a wider surface opposite a bonding material 32 than the bonding material. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Majumdar et al. and Wensel to ensure a sufficient radiation surface, as shown by Tanaka et al.

Allowable Subject Matter

Claims 4, 6 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 6/9/04 have been fully considered but they are not persuasive.

- The applicant argues that a magnitude relation between the insulation 228 and the bonding material recited in claim 1 cannot be derived from Wensel.

The Examiner respectfully disagrees.

Majumdar et al. disclose a bonding material 2 bonding between the second surface of the lead frame and the metal block; wherein the bonding material 2 has a high heat conduction (column 8, line 18).

Wensel discloses the insulation 228 is comprised of material including polyamide material or leadlock tape material (column 5, lines 62-63 and claims 7-8). Wensel doesn't specifically disclose that the insulation 228 has a high heat conduction. The insulation 228 only uses to prevent damage to the mold, the heat sink (column 2, lines

62-67) and to provide a longer mold life (column 5, lines 66-67). Further more, it is well known in the art that the polyamide material or leadlock tape material doesn't have a high heat conduction.

- In response to applicant's argument that it is not obvious to combine the references, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).
- The applicant argues that Wensel does not teach or suggest an element corresponding to the bonding material recited in claim 1.

The applicant's arguments have been fully considered but they are not persuasive because this argument has no immediate apparent relevance to the issues presented by the rejection before us since an applicant cannot show nonobviousness by attaching references individually wherein the rejection is based upon a combination of references. *In re Young*, 403 F. 2d 754, 757, 159 USPQ 725, 728 (CCPA 1968).

It should be noted that the rejection of claim 1 is not based on anticipation, but rather, is based on obviousness.

Examiner relies on the combined teachings at Majumdar et al. and Wensel. Wensel is not relied on for teaching a bonding material. Wensel is relied on for showing the insulating layer. The examiner thus regards the applicant's assertions as

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constituting evidence that the applicant has failed to consider as a whole the prior art teachings disclosed by the combining of the references.

- In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case:

Wensel discloses a semiconductor device (cover fig.) comprising:

a semiconductor element 214;

a metal block 216 on a second surface of a lead frame 220;

an insulation layer 228 (column 5, lines 60 et seq.) on the metal block opposite the lead frame. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Majumdar et al. to prevent damage to the mold and heat sink, as shown by Wensel (column 2, lines 62-67).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DLN



LONG PHAM
PRIMARY EXAMINER